

A REVIEW OF THE AUSTRALIAN SPECIES OF *CORYSANTHES*
(ORCHIDACEAE).

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(With Plate xii.)

[Read 27th April, 1925.]

For some years one of us (H.M.R.R.) had been unable to reconcile the determinations made in New South Wales, Victoria and Tasmania respectively, of the terrestrial orchid *Corysanthes pruinosa* Cunn. The Victorian *C. pruinosa* appeared to be identical with the Tasmanian *C. diemenica* Lindl.; the Tasmanian *C. pruinosa* was known in Victoria and South Australia as *C. fimbriata* R. Br. Neither agreed with the plants known as *C. pruinosa* and *C. fimbriata* in New South Wales, depicted by Fitzgerald (Australian Orchids, Vol. I, part 1). The suggestion was made that all three were really only variations of one species (*Vict. Nat.*, May, 1926), and as a result of correspondence on the subject between the present authors, both were convinced that the suggestion would not meet the facts. From many other observers in and beyond Victoria and New South Wales we received numerous notes and specimens bearing on the problem. Finally we reached complete agreement in regard to a solution; and as our investigations had involved some study of other forms of *Corysanthes*, we decided to collaborate in a review of all the known Australian species of the genus. Before we submitted the review for publication, we sent the MS. to Dr. R. S. Rogers of Adelaide for his opinion and we feel sure that the fact that our conclusions are endorsed by such an authority will carry weight with all into whose hands this review may come: we desire gratefully to acknowledge some valuable suggestions which Dr. Rogers has made in regard to details. We also wish to acknowledge here the kindness of the following botanists and observers, whose assistance has been of great value to us: Mrs. Edith Coleman, Blackburn, Victoria; Mr. P. F. Morris, Assistant-Government Botanist, Melbourne; Mr. and Mrs. E. Nubling, Sydney; Mr. C. T. White, Government Botanist, Brisbane; Dr. Darnell Smith, Director, Sydney Botanic Gardens; Mr. E. Cheel, Curator, Sydney National Herbarium; Mr. L. Rodway, Government Botanist, Hobart; Mr. A. B. Braine, Murrumbidgee, Victoria; Mr. A. J. Tadgell, Melbourne; Mr. G. V. Scammell, Mosman, N.S.W.; Ven. Archdeacon Atkinson, Tasmania; Dr. H. L. Kesteven, Bullahdelah, N.S.W.; Mrs. H. Curtis, Tambourine Mtn., Queensland; Mr. A. G. Hamilton, Chatswood, N.S.W.; Mr. T. S. Hart, Bairnsdale, Victoria; Rev. G. Cox, Morningson, Victoria.

We include one hitherto undescribed species, under the name *C. dilatata*. This plant is no new discovery, but is the form which has been known in Victoria and South Australia as *C. fimbriata*, and in Tasmania as *C. pruinosa*. It is, however, consistently distinct from either Brown's or Cunningham's species, and we believe that with the recognition of its independent specific rank, the confusion we have alluded to will entirely disappear.

In this review we recognize seven valid species of *Corysanthes* for Australia and Tasmania, viz.: (1) *C. fimbriata* R. Br., (2) *C. diemenica* Lindl., (3) *C. pruinosa* Cunn., (4) *C. dilatata* Rupp and Nicholls, (5) *C. undulata* Cunn., (6) *C. bicalcarata* R. Br., (7) *C. unguiculata* R. Br.

It will be noted that we retain Robert Brown's names in preference to those of Salisbury. This matter has been discussed by Mr. E. E. Pescott in the *Victorian Naturalist* for May, 1926.

During a visit to Sydney in July, 1927, the late R. D. Fitzgerald's unpublished plates and drawings were inspected in the Mitchell Library. By the courtesy of the Librarian, Mr. E. Nubling very kindly made careful tracings for our use, of the figures of *Corysanthes Hamiltonii* in this collection. We have also examined the specimens under this name in the Sydney and Melbourne National Herbaria. We have independently arrived at the same conclusion in regard to Fitzgerald's plant—namely, that it is in all essential features identical with Lindley's *C. diemenica*.

Before dealing with the species seriatim, we offer the following remarks on various points of importance:—

1. *Confusion Between Certain Species.*—This is evident at least as far back as Sir J. D. Hooker's time, for in his "Flora Tasmaniae", Vol. II, there is depicted under the name *C. fimbriata* the form since known in Tasmania as *C. pruinosa*, and in this review called *C. dilatata*. In Baron von Mueller's Census of Australian Plants (1889), *C. pruinosa* appears to be given the range of the whole continent except the dry interior and the far north. The only *Corysanthes* specimens in the Melbourne National Herbarium from Western Australia appear to be identical with *Corysanthes fimbriata* or *C. dilatata*. It is, of course, difficult to determine herbarium specimens of *Corysanthes* (except in one or two cases) with absolute certainty, but the western specimens under notice, as far as can be observed, do not agree with Fitzgerald's exposition of *C. pruinosa*. In the Sydney Herbarium, there are three specimens from King George Sound, Western Australia (collected by Lieut.-Col. B. T. Goadby), which perhaps call for further investigation. In the absence of living plants, photographs, or detailed drawings, we recognize the need of caution in determining these western forms: but we cannot regard them as identical with *C. pruinosa* in Fitzgerald's plate. Indeed, it will be seen below that no satisfactory evidence has reached us of the existence of Cunningham's species *C. pruinosa* outside New South Wales. In the 1923 Census of Victorian Plants published by the Field Naturalists' Club, Victoria is credited with four species—*C. unguiculata*, *C. bicalcarata*, *C. fimbriata*, and *C. pruinosa*. In correspondence between us it was pointed out that it was impossible to reconcile the Victorian determinations of the last two species with the determinations illustrated by Fitzgerald in New South Wales. The Victorian *C. fimbriata* was regarded as identical with the Tasmanian plant called *C. pruinosa*, but we were not satisfied that the latter corresponded with Fitzgerald's plant. The Victorian *C. pruinosa* was still less like it, and appeared in all respects identical with the Tasmanian *C. diemenica*. The drawings (Plate xii, series 4, 1-9) demonstrate beyond doubt that in the plant hitherto called *C. fimbriata* in Victoria and South Australia, and *C. pruinosa* in Tasmania, we really have a very distinct species, to which the name *C. dilatata* is given. Thus—

C. diemenica Lindl. = the supposed *C. pruinosa* of Victoria and South Australia.

C. dilatata Nicholls = the supposed *C. fimbriata* of Victoria and South Australia, and the supposed *C. pruinosa* of Tasmania.

We consider that Fitzgerald's plate agrees in all essentials with Bauer's type-drawings of Robert Brown's *C. fimbriata* (Atlas of Brown's "Miscellaneous Works", Royal Society, 1868). We also accept Fitzgerald's plate as an accurate representation of the type form of Cunningham's *C. pruinosa*. While we are inclined to believe that evidence points to the occurrence of *C. fimbriata* in all the Australian States, of *C. pruinosa* we have been unable to secure specimens, or to find indisputable records, from any locality except within New South Wales. The curators of the Brisbane and Sydney National Herbaria very kindly sent their *Corysanthes* material for inspection. The specimens labelled *C. pruinosa* from States other than New South Wales were all identical with either *C. diemenica* or the form here called *C. dilatata*. In the Brisbane collection, one specimen, collected by W. Bauerlen in 1890, is identical with the New South Wales *C. pruinosa*, but the locality cannot be identified, and Mr. C. T. White does not think it was in Queensland.

2. *Difficulties of Determination.*—The difficulties have arisen chiefly in connection with *C. fimbriata*, *C. diemenica*, and *C. pruinosa*. The non-recognition of the plant now named *C. dilatata*, as a species quite distinct from either *C. fimbriata* or *C. pruinosa*, and the overlooking by many botanists of the definite character of Lindley's *C. diemenica*, would appear to have been mainly responsible for the difficulties. A comparison of the series 1 to 4 in the figures of Plate xii will show at once how distinct these four species are when examined critically. There is little difficulty in regard to the remaining three species. *C. bicalcarata* and *C. unguiculata* are readily determined from any of the existing descriptions. *C. undulata* will not be found in any existing handbook of Australian flora, because it was apparently never recorded since Cunningham described it in 1833 (New South Wales Magazine, No. 1) until its re-discovery at Bullahdelah (N.S.W.) in 1924. Dr. Rogers reported the circumstances, reprinted Cunningham's description, and added further particulars (*Trans. Roy. Soc. S. Aust.*, Vol. li, 1927). In May, 1927, Dr. H. L. Kesteven of Bullahdelah sent a number of living specimens, from which we are able to supplement Dr. Rogers' notes with other details of this interesting little orchid.

3. *Elongation of Flowering Stem after Fertilization.*—This interesting habit (shared by some species of *Chiloglottis*) is characteristic of our *Corysanthes*. It has commonly been regarded as a device for securing the dispersal of the seeds by wind, but we confess we are not satisfied with this explanation. In the fern-trunk form of *C. dilatata* (see below) there is almost invariably vigorous elongation, and it does not seem possible to apply the wind theory to a plant growing on the trunks of fern-trees in deep, sheltered forest gullies. In August, 1927, one of us (W.H.N.) carefully watched four plants of *C. diemenica*, and came to the conclusion that elongation of the stem was dependent upon the moisture supplied to the plants. At the same time, it must be said that the habit requires some further explanation. Colonies of more than one species have been observed, in which some plants had fruiting stems up to 6 inches, and others developed seeds without elongating the stem at all. The habit appears to be strongest and most consistent in *C. undulata* and *C. dilatata*, but is often very pronounced in *C. diemenica*. It is feebly developed in *C. unguiculata* and *C. pruinosa*. Mr. E. Nubling reports finding fruiting plants of *C. fimbriata* near Como, N.S.W., in September, 1927, with stems up to 6 inches. This is the only record of the habit in *C. fimbriata* which we have obtained. As far as we have been able to ascertain,

the habit is very unusual in *C. bicalcarata*: but specimens have been received from Dr. H. L. Kesteven of Bullahdelah, with fruiting stems several inches in length. It is therefore clear that all our Australian species possess the capacity for this interesting habit, the purpose of which seems to call for fuller investigation.

4. *The Leaves of Corysanthes*.—There is close resemblance between the leaves of most of our Australian species. One leaf, close to the ground, is the rule: exceptionally two are found. In *C. undulata*, *C. bicalcarata*, and *C. unguiculata* the leaf is a darker green than in the others, and—particularly in the last two—is often reddish-tinged. In all forms it is usually more or less “frosted” on the under surface. The shape varies from orbicular to ovate or cordate, and in all species there is an occasional tendency to lobation.

5. *Habitat*.—The principal habitat of Australian species of *Corysanthes* is (on the continent) the coastal area. In the eastern States this term specifically denotes the country between the Great Dividing Range and the ocean—a belt varying in width from a few to 60 miles. Some species also occur throughout the ramifications of the Dividing Range itself, and—much less commonly—on the interior slopes. In Tasmania they may be found in most parts of the State, except at high elevations and on open grass-lands. The localities mentioned below (followed by the collector’s name or initials) are those from which we have ourselves personally examined either living or herbarium specimens. Specimens from the National Herbaria are indicated.

Notes on the Seven Australian Forms Here Treated as Valid Species.

We offer below a tabulation of the main characteristics distinguishing the four species in regard to which confusion has existed in the past, viz.: *C. fimbriata*, *C. diemenica*, *C. pruinosa*, and *C. dilatata*. In this table it will be noted that reference is not made to (1) the columns, (2) the calli on the labella. Both these features are subject to variation, and it would be difficult to include them satisfactorily in so brief a summary. Typical columns and calli are shown in the series of figures on Plate xii. It will be observed that we do not follow Fitzgerald in making the presence of calli a distinguishing feature of *C. pruinosa* in contrast with *C. fimbriata*. Their presence is perhaps more consistent in the former, but is by no means uncommon in the latter. With regard to the remaining three species, we feel that it is unnecessary to add to the existing descriptions of two such well-defined species as *C. bicalcarata* and *C. unguiculata*; while Dr. Rogers has sufficiently described *C. undulata* in his recent paper referred to above. Our remarks on these species will be restricted, as far as possible, to supplementing information which is already available.

1. *CORYSANTHES FIMBRIATA* R. Br. Plate xii, series 1, figs. 1 to 8.

Cf. Bauer and Fitzgerald, in publications referred to above under “Confusion Between Certain Species”. If columns 1 and 4 in the table be studied in conjunction with series 1 and 4 of the figures on Plate xii, we think it will be freely admitted that we have here two distinct species. That does not prove that the form to which we have given the name *dilatata* is not really Robert Brown’s *C. fimbriata*. It has been so regarded in Victoria and South Australia, and Hooker’s plate, already alluded to, may be cited in support. But we submit the following points against this determination: (i) Hooker’s decision was evidently not endorsed in Tasmania, where *C. dilatata* has since been generally known as *C. pruinosa*; (ii) Bauer’s type-drawings of Brown’s species cannot be claimed as

Table of Main Characteristics distinguishing *C. fimbriata*, *C. diemenica*, *C. pruinosa*, and *C. dilatata*.

1. <i>C. fimbriata</i> R.Br.	2. <i>C. diemenica</i> Lindl.	3. <i>C. pruinosa</i> Cunn.	4. <i>C. dilatata</i> Rupp and Nicholls.
Dorsal sepal broad-emuncate, dark or with dark spots.	Dorsal sepal similar to that of <i>C. fimbriata</i> in outline, but narrower; greyish or sometimes dark.	Dorsal sepal narrow, paddle-shaped, greyish-green, finely spotted.	Dorsal sepal very broad above, narrowing abruptly, always dark reddish-purple.
Flower varying in size, but often the largest of the genus in Australia; very fragile and loosely-set; somewhat depressed, and always close to the leaf.	Flower usually small; compact, firm, and stiffly-set; close to the leaf.	Flower small (with rare exceptions), loosely-set, variable in distance from leaf.	Flower typically rather large (small in the fern-trunk form); firm, erect, and high off the leaf.
Lamina of labellum always considerably longer than the tube; margins dark, slightly incurved, fringed with long dark fimbria.	Lamina of labellum approximately equal to the tube; margins very dark and conspicuously incurved, minutely denticulate.	Lamina of labellum shorter than the tube (rarely as long); margins imperfectly veined, hardly incurved, fringed with pale or dark fimbria.	Lamina of labellum conspicuously shorter than the tube; margins widely expanding, prominently veined, coarsely denticulate; the teeth occasionally prolonged near the apex of the lamina into one or two fimbria.
Central boss of labellum imperfectly defined, varying from white to very dark.	Central boss prominent, pure white or with a dusky patch in the middle.	Central boss pale, often with a dusky patch in the middle.	Central boss large and prominent, usually with two small posterior extensions; white or suffused with purple.
Auricles variable, but in most cases large and prominent.	Auricles usually large and prominent.	Auricles with very small apertures, often appearing like mere gibbosities.	Auricles consistently large and prominent.
Sepals and petals more or less appressed, often held back by the lamina of the labellum. Sepals connate to the middle. Petals slightly broader than sepals, typically but not invariably bifid at the tips.	Sepals and petals free behind the lamina of the labellum. Sepals projected forward or erect, slender, entire. Petals usually much shorter and broader, unequally bifid at the tips.	Sepals and petals free below the lamina of the labellum, but often projecting through the fimbria, rather long (sepals often conspicuously so), entire.	Sepals and petals free much below the lamina of the labellum, short and very frequently all bifid at the tips.
Ovary short, slender.	Ovary short, broad.	Ovary short.	Ovary very long.

depicting our *C. dilatata*; (iii) the margins of the labellum in *C. dilatata* cannot be accurately described as fimbriate, they are boldly dentate; (iv) so far as we can ascertain, *C. dilatata* has not been found in Queensland or New South Wales, from both of which *C. fimbriata*, as Fitzgerald shows it, is recorded; (v) the type form of Brown's species undoubtedly came from New South Wales, where Fitzgerald's plant is fairly common, and never approaches *C. dilatata*. These considerations seem sufficient evidence against the identity of *C. dilatata* with Brown's *C. fimbriata*.

The flower of *C. fimbriata* varies in size, but is usually large, and often attains greater dimensions than that of any other Australian species. One specimen measured nearly 3½ cm. As a general rule, the flowering season begins very early—in the Paterson district of N.S.W. it has been found in full bloom at the end of April. Notwithstanding the confusion with *C. dilatata*, there is no doubt that the real *C. fimbriata* occurs in Victoria; the records below are those of plants identical with the N.S.W. form.

Range of Species.—Q'land, N. S. Wales, Vict., Tas.

We are very doubtful whether either Brown's *C. fimbriata* or Cunningham's *C. pruinosa* occurs in Western Australia. We have examined the only Western Australian specimens which were available to us in New South Wales and Victoria—specimens in excellent condition in the Sydney and Melbourne Herbaria. We are of opinion that these specimens are identical, and that they appear to be a form of *C. dilatata* (described below) with a shorter labellum-tube than the type. We do not care to press this determination without having seen living plants, but we are confident that they do not agree with either *C. fimbriata* or *C. pruinosa*.

Localities.—Q'land: Tambourine Mountain, Mrs. H. Curtis (also specimens in Bris. Nat. Herb.); Brisbane River, F. M. Bailey (Bris. Nat. Herb.); Brighton (Bris. Nat. Herb.). N. S. Wales: Paterson, H.M.R.R.; Kurnell, J. L. Boorman (Syd. Nat. Herb.); National Park, E. Nubling; Blue Mountains, G. V. Scammell. Vict.: Bairnsdale, T. S. Hart; Frankston, Mrs. Edith Coleman (in Mr. A. J. Tadgell's herbarium); also specimens in Melb. Nat. Herb. from Sealer's Cove, etc. Tas.: Low Head, H.M.R.R. and Mrs. G. E. Perrin.

2. *C. DIEMENICA* Lindl. Plate xii, series 2, figs. 1 to 9.

See Rodway's "Flora of Tasmania", p. 196. Mr. Rodway states that he has been disposed to regard *C. diemenica* as "a depauperised form of *C. fimbriata*". The differences between the two, however, appear to be constant, and nothing like an intermediate form has come under our notice. Small flowers of *C. fimbriata* do not indicate any tendency to approach *C. diemenica*, nor do large flowers of the latter bear any greater resemblance to the former. If they were merely variants, one might reasonably expect signs of their identity in the character of the margins of the labellum-lamina. But in *C. fimbriata* these are consistently fringed with the long, loose fimbria which give the species its name: in *C. diemenica* they are always minutely denticulate. Reference to the table will show other important differences. It will be noticed that we have said of *C. diemenica*, "petals in most cases much shorter and broader (than sepals)". In some Tasmanian specimens sent by Archdeacon Atkinson, however, the petals are nearly twice as long as the sepals.

All the Tasmanian specimens of *C. diemenica* which we have seen are undoubtedly identical with the plant which has been known in Victoria and South

Australia as *C. pruinosa*. Unfortunately none of Cunningham's specimens are available for reference; but we think that the following points supporting the recognition of this orchid as *C. diemenica* will be found convincing: (i) It differs constantly in many details (see table) from the New South Wales *C. pruinosa* as depicted by Fitzgerald (Vol. I, part 1); (ii) it agrees well with Lindley's *C. diemenica*, and is beyond doubt identical with the Tasmanian plant known by that name; (iii) the type form of *C. pruinosa* came from New South Wales. If, as we believe (see above, p. 81), Fitzgerald's *C. Hamiltonii* is identical with the plant under discussion, it is obvious that Fitzgerald did not recognize this plant as *C. pruinosa*; (iv) Cunningham's description of his species ("New South Wales Magazine", No. 1, 1833) distinctly states of the labellum-lamina, "marginibus fimbriatis". It is surely not possible to call them fimbriate in *C. diemenica*.

Range of Species.—N. S. Wales (*C. Hamiltonii* Fitzg.), Vict., Tas., S. Aust. (In N. S. Wales the plant is apparently rarely met with.)

Localities.—N. S. Wales: Guntawang, A. G. Hamilton (in Syd. Nat. Herb.). Vict.: Cheltenham, Oakleigh, and Lockwood, A. B. Braine; Healesville, Mrs. Edith Coleman; Wattle Glen, D. Matthews; Sandringham, A. J. Tadgell (incl. a specimen with 2 flowers); Mentone, etc., W.H.N.; Bairnsdale, T. S. Hart; Mornington, Rev. G. Cox; Lara, Rev. A. C. F. Gates; Glenelg River, C. Walter (in Syd. Nat. Herb.). Tas.: Penguin, etc., Archdeacon Atkinson; Hobart, Granton, Launceston, and Low Head, H.M.R.R.

(In Syd. Nat. Herb. there are specimens labelled "*C. fimbriata* var. *diemenica*" which are undoubtedly identical with the species described in this review as *C. dilatata* Rupp and Nicholls).

3. *C. PRUINOSA* Cunn. Plate xii, series 3, figs. 1 to 7.

See also Fitzgerald, Vol. I, part 1. Cunningham's original description of this species is referred to above under *C. diemenica*, and is quoted by Dr. Rogers (*Trans. Roy. Soc. S. Aust.*, li, 1927). There is a strong likeness between this and *C. fimbriata*. In the distinctions emphasized by Fitzgerald, there are two which should probably be omitted: (1) the calli on the labellum, which really occur in both species, (2) the distance of the flower from the leaf. *C. pruinosa* is very variable in this respect, though *C. fimbriata* is more consistently "squat". The main points of difference are set out in the table above. The dorsal sepal is perhaps one of the outstanding features distinguishing the two. In *C. fimbriata* it has the form of a broad wedge, and is frequently dark reddish-purple; when not so, it is of a peculiar greenish tint, with large dark spots. In *C. pruinosa* it is narrow, and in outline shaped like a paddle. The colour is usually greyish, with darker spots. In two specimens sent by Mr. E. Nubling from the N.S.W. National Park, the dorsal sepal is extraordinarily long, curving over the rest of the flower like the galea in some forms of *Pterostylis*.

We have already mentioned our inability to obtain any definite and indisputable records of *C. pruinosa* from localities outside New South Wales. The veteran botanist, Mr. A. G. Hamilton, wrote to say that he believed he had seen a form agreeing with Fitzgerald's figures at the Werribee Gorge in Victoria. One of us (W.H.N.) made a special trip to the locality, and after much difficulty succeeded in finding one or two "colonies"—without a single flower. Descriptions and sketches furnished by Mr. Brittlebank, who lives near by, convinced him that these plants are identical with *C. dilatata*, and not with the N.S.W. *C. pruinosa*. It is most difficult to believe that this species is really confined to New South

Wales. It is so abundant there, over such a large area, that it seems probable it will yet be found in the adjoining States.

Range of Species.—New South Wales. (One specimen from an unknown locality, which may not be in N.S.W., is in Bris. Nat. Herb.)

Localities.—Lane Cove, Parramatta River, Lilyvale, Narrabeen, Hawkesbury R., Bullahdelah, and Paterson, H.M.R.R.; National Park, E. Nubling and G. V. Scammell; Blue Mountains, G. V. Scammell.

4. *C. DILATATA*, n. sp. Plate xii, series 4, figs. 1 to 9; and series 5, fig. 1.

See also figures in Hooker's "Flora Tasmaniae", Vol. II; and in Dr. Rogers' "South Australian Orchids", p. 20; in both instances under the name *C. fimbriata*.

Labello ecalcarato, infra cucullato, supra dilatato; disco glabro; marginibus dilatatis, dentatis; galea basi attenuata, erecta, curvata, apice obtusa aut mucronata.

Plant slender, about 2½-3 cm. high above the leaf. Flower in the typical form rather large, standing erect from the leaf above a long ovary of about 7 mm. Leaf of variable size and shape, commonly orbicular-cordate, with a tendency to lobation, green, frosty beneath. Dorsal sepal very broad and low-set, concave; lower portion erect, then curved, the apex projecting over and beyond the lamina of the labellum; width at broadest part about 1½ cm.; colour dark reddish-purple over pale green. Lamina of labellum always shorter than the tube, often much so; margins widely expanding at maturity, boldly and coarsely toothed. Veins between margins and central boss irregularly blotched, prominent, purplish, ending at the apices of the teeth. Central boss large and conspicuous, whitish except in two forms referred to below, almost circular, but usually with two posterior ear-shaped extensions; calli round the base red, acuminate. Auricles very conspicuous, translucent, with two purplish-red marks above them; openings much dilated, facing downwards and forwards, most frequently much below the lamina. Beneath them are the sepals (5 mm.) and the petals (2-3 mm.) projecting forward, all frequently with bifid tips and purplish markings. Column about 2 mm., not conspicuously winged. Stem often elongated after fertilization, occasionally attaining 25 cm. in height. Fl. July to early September.

Mrs. Edith Coleman has drawn our attention to the variations between the type form of this orchid and that which is found growing on the trunks of fern-trees in Victorian forest gullies. The flower is always smaller than the type, and is usually thrown back from the leaf by the curving of the pedicel. This is probably due to the perpendicular attitude of the fern-trunk. The central boss is suffused with purple. The sepals often appear connate, but a touch will separate them. Archdeacon Atkinson sent specimens of the type form from N.W. Tasmania with large flowers of very dark colour, in which the central boss was suffused with purple as in the little fern-trunk form.

The differences between this plant and the two species with which it has been confused—*C. fimbriata* and *C. pruinosa*—will be readily appreciated if series 1, 3, and 4 of figures on Plate xii be compared. The outline of the dorsal sepal of *C. dilatata* is almost flabellate, the contraction of the broad hood being very abrupt. The flower is strikingly erect and firmly set, in contrast with the depressed attitude of both the other species—even when the flower of *C. pruinosa* is well off the leaf it has nothing of the upright, "military" aspect of *C. dilatata*. The widely-expanding dentate margins of the lamina in the latter also give it a very

distinctive appearance. The auricles, sepals, and petals are not concealed as in the others, and the ovary is relatively very long.

Range of Species.—Vict., Tas., S. Aust.

Localities.—Vict.: Lockwood, A. B. Braine; Hawkesdale, H. B. Williamson (in Syd. Nat. Herb., labelled *C. pruinosa*); Healesville, Mrs. Edith Coleman; Sherbrooke and Lorne, W.H.N.; Fern Tree Gully, F. J. Bishop; Gembrook, D. Matthews; Olinda, A. J. Tadgell. Tas.: Penguin, Archdeacon Atkinson; Hobart, Relbia, Launceston and Low Head, H.M.R.R. S. Aust.: National Park, Dr. R. S. Rogers (in Syd. and Bris. Nat. Herb., labelled *C. pruinosa*).

5. *C. UNDULATA* Cunn. Plate xii, series 5, figs. 2 to 9.

The re-discovery of this diminutive species by one of the present writers at Bullahdelah, N.S.W., in 1924, after its disappearance from botanical records for over 90 years, has been mentioned (*Vict. Nat.*, May, 1926), and reported more fully by Dr. Rogers (*Trans. Roy. Soc. S. Aust.*, li, 1927). Specimens received in 1927 from Dr. H. L. Kesteven of Bullahdelah have enabled us to supply some further details of interest. The dorsal sepal is very conspicuously reticulate-veined. The lamina of the labellum is almost circular in appearance, but has a prominently mucronate apex; and the whole of its anterior upper surface is thickly studded with calli of two forms. The margins are very minutely denticulate, with occasional groups of very slender, short, dark fimbria; their general contour is irregularly undulate. The labellum-tube has a remarkable protuberance directly under the base of the lamina. It is quite as definitely bicalcarate as the tube of *C. bicalcarata*, but the spurs are relatively shorter. Immediately above each spur there is a small perforation in the tube. In most specimens the petals are almost abortive. The flowering stem is conspicuously elongated after fertilization.

C. undulata occurs on the lower slopes of the Alum Mountain close to the township of Bullahdelah, favouring moist clay or poor soil in scrubs of *Melaleuca nodosa*.

Range of Species.—N. S. Wales.

Locality.—Bullahdelah, H.M.R.R. and Dr. H. L. Kesteven.

6. *C. BICALCARATA* R. Br. Plate xii, series 6, figs. 3, 4, 8, 9.

See also Fitzgerald, Vol. I, part 2. Our figures illustrate considerable variation in the dimensions of the spurs. The unique form of this orchid renders it very easy of identification, and it is unnecessary to add to the descriptions already available. In Victoria and Tasmania *C. bicalcarata* is regarded as one of the smaller species, but in northern N. S. Wales and in Queensland it sometimes rivals *C. fimbriata* in size. It is, however, variable in this respect; among the smallest specimens we have seen are three collected by the late E. J. Banfield on Dunk Island, off the coast of North Queensland. These are in the Brisbane National Herbarium. At Bullahdelah a very large white-flowering form was found earlier than the type. A specimen of this form from the Pine River, north of Brisbane, is in the Brisbane collection, and Mrs. H. Curtis records it from Tambourine Mountain.

Range of Species.—Q'land, N. S. Wales, Vict., Tas.

Localities.—Q'land: Tambourine Mountain, Mrs. H. Curtis; Brisbane River, F. M. Bailey; Pine River, — Stutter; Ravenshoe, Miss Blakeney; Dunk Island, E. J. Banfield (last four in Bris. Nat. Herb.). N. S. Wales: Hornsby, W. F. Blakely (in Syd. Nat. Herb.); National Park, E. Nubling; Blue Mountains, G. V. Scammell;

Bullahdelah and Paterson, H.M.R.R. Vict.: Healesville, Mrs. Edith Coleman.
Tas.: Eaglehawk Neck, Archdeacon Atkinson.

7. *C. UNGUICULATA* R. Br. Plate xii, series 6, figs. 1, 2, 5, 6, 7.

See also Fitzgerald, Vol. I, part 2. This dainty little flower is easily identified, and requires but brief comment here. For an excellent exhaustive description, see Dr. Rogers' "South Australian Orchids", p. 18. The re-discovery of *C. undulata* probably deprives *C. unguiculata* of the distinction of being the smallest Australian *Corysanthes*. We have not come across any reference to the very remarkable arrangement of calli in this species; seen under a magnifier the glistening array is quite unique. *C. unguiculata* has an extensive range, but is sparsely distributed and by no means common.

Range of Species.—N. S. Wales, Vict., Tas., S. Aust.

Localities.—N. S. Wales: National Park, E. Nubling; Kurnell, J. L. Boorman (in Syd. Nat. Herb.). Vict.: Oakleigh, A. B. Braine and W.H.N.; Healesville and Wilson's Promontory (with elongated stems), Mrs. Edith Coleman; "Port Phillip", C. French, jun. per F.v.M. (in Bris. Nat. Herb.). Tas.: Lindisfarne, H.M.R.R.

List of Authorities Consulted.—Robert Brown, *Prodromus Florae Novae Hollandiae*, and *Botanical Atlas*. Hooker, *Flora Tasmaniae* and *Icones Plantarum*. Lindley, *Genera and Species of Orchids*. *New South Wales Magazine*, No. 1, 1833. Paxton, *Botanical Dictionary*. Bentham and Mueller, *Flora Australiensis*, Vol. VI. Fitzgerald, *Australian Orchids*. Mueller, *Census of Australian Plants*, 1889, and *Key to the System of Victorian Plants*. Dr. R. S. Rogers, *South Australian Orchids*. Bailey, *Queensland Flora*. Moore and Betche, *Handbook of the Flora of N.S.W.* Rodway, *Flora of Tasmania*. Victorian F.N.C. *Census of Victorian Plants*, 1923.

EXPLANATION OF PLATE XII.

Series 1. *C. fimbriata* R. Br.—1, side view; 2, front view (N.S.W. specimens); 3, labellum from front (Victoria); 4, calli from margin below boss; 5, ovary, column, sepals and petals; 6, large auricles; 7, small auricles; 8, dorsal sepal. (In this and the corresponding figures in other series, the dorsal sepal is drawn from above, flattened out to show its contour.)

Series 2. *C. diemenica* Lindl.—1, side view (Victoria); 2, front view (Tasmania); 3, a slender Victorian form*; 4, labellum from front, with conspicuously inturned margins; 5, calli from margin below boss; 6, column, sepals and petals; 7, ovary, sepals and petals of a Tasmanian form with long upright petals, covering auricles; 8, dorsal sepal; 9, acute apex often seen in dorsal sepal.

* This slender form seems to us to agree in practically all respects with *C. Hamiltonii* Fitzg.

Series 3. *C. pruinosa* Cunn.—(All N.S.W.). 1, side view, erect form; 2, front view, depressed form; 3, labellum from front; 4, calli from margin below boss; 5, ovary, column, sepals and petals; 6, auricles, with sepals and petals covering the small orifices; 7, dorsal sepal.

Series 4. *C. dilatata* Rupp and Nicholls.—(Victoria). 1, small fern-trunk form, front view; 2, type form, front view; 3, labellum from front; 4, calli from margin below boss; 5, column, sepals and petals; 6, ovary, auricles, sepals and petals; 7, dorsal sepal; 8, 9, variations in apex of dorsal sepal.

Series 5. *C. dilatata* Rupp and Nicholls and *C. undulata* Cunn.—1, Tasmanian *C. dilatata*, side view; 2 to 9, *C. undulata* (N.S.W.); 2, front view; 3, side view; 4, labellum from front; 5, calli from margin below boss; 6, column from side, with sepals, and showing almost abortive petal; 7, apex of spur from below; 8, ovary, spurs, sepals, and minute orifices in tube; 9, dorsal sepal.

Series 6. *C. unguiculata* R. Br. and *C. bicalcarata* R. Br.—1, 2, 5, 6, 7, *C. unguiculata* (Victoria). 1, side view; 2, front view; 5, ovary, column, sepals and petals, from side; 6, column from front; 7, part of labellum, showing calli (single callus below); 3, 4, 8, 9, *C. bicalcarata*; 3, front view (Victoria); 4, side view (N.S.W.); 8, labellum from front, with spurs, sepals, and ovary below; 9, column from front, with sepals and petals.

All figures are two-thirds natural size, except No. 1 of Series 4, which is approximately one-third natural size.